

AN ANIMAL COUNTER USING A CAMERA AND TRIGGER SYSTEM

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ABSTRACT

A light beam system for triggering a camera, suitable for counting and identifying animals using a 'run', is described.

INTRODUCTION

A problem encountered by many zoologists is that of obtaining animal movement data. The system described here was devised to count and identify tagged opossums (*Trichosurus vulpecula*) using a 'run' at night. An animal crossing a light beam triggers a 35 mm motor-drive camera.

TRIGGER SYSTEM

The trigger system consists of a light source and photo-sensor placed about 2 m apart across the opossum run.

Light source: In the prototype the light source consisted of a 6 volt projector-type bulb (operated at 3 volts), focused with a condensor, through a red filter, onto the sensor. This produced a low intensity red beam, though any light beam, including infrared for an 'invisible' beam, would be satisfactory.

Photosensor: This consists of a light dependent resistor (L.D.R.) mounted at the base of a 600 mm length of 20 mm diameter grey P.V.C. tube. Interruption of the light beam produces a resistance change in the L.D.R. which triggers an electronic switch.

CIRCUIT OPERATION

The circuit is shown in Fig 1, i. With the L.D.R. (PCCL) illuminated, a resistance of 20 kilohms is obtained. Occlusion of the light beam increases this to approximately 1 Megohm. This reduces the bias voltage from the voltage divider CCL/R_3 to the base of TR_1 , turning TR_1 off. R_3 is used to set the bias voltage at 550 to 600 mV for the unilluminated state. When TR_1 stops conducting, the base bias of TR_2 increases, making TR_2 conduct. This develops a potential across R_5 , firing the 'Schmitt Trigger' TR_3 and TR_4 . The brief pulse generated here turns on TR_5 which switches the 'load'.

If a switch-on time of 5 sec to 1 min is required to operate a movie camera, then the Schmitt Trigger Circuit can be changed

to give a longer pulse (Fig 1, ii); the greater the value of C_{102} , the longer the pulse.

In the prototype the relay in the motor drive unit powered by the 12 volt motor drive supply at 20 MA, produced the load. However, any electromagnetic device, relay or counter, can be used here. If a higher voltage than the 9 volt regulated supply is required to operate the load, an external supply of up to 50 volts DC can be used (Fig 1, iii) and for higher current requirements TR_5 can be changed to a high power NPN type.

The inclusion of the 'Schmitt Trigger' was considered necessary to prevent a high current drain through the load, should the light beam remain broken for any length of time.

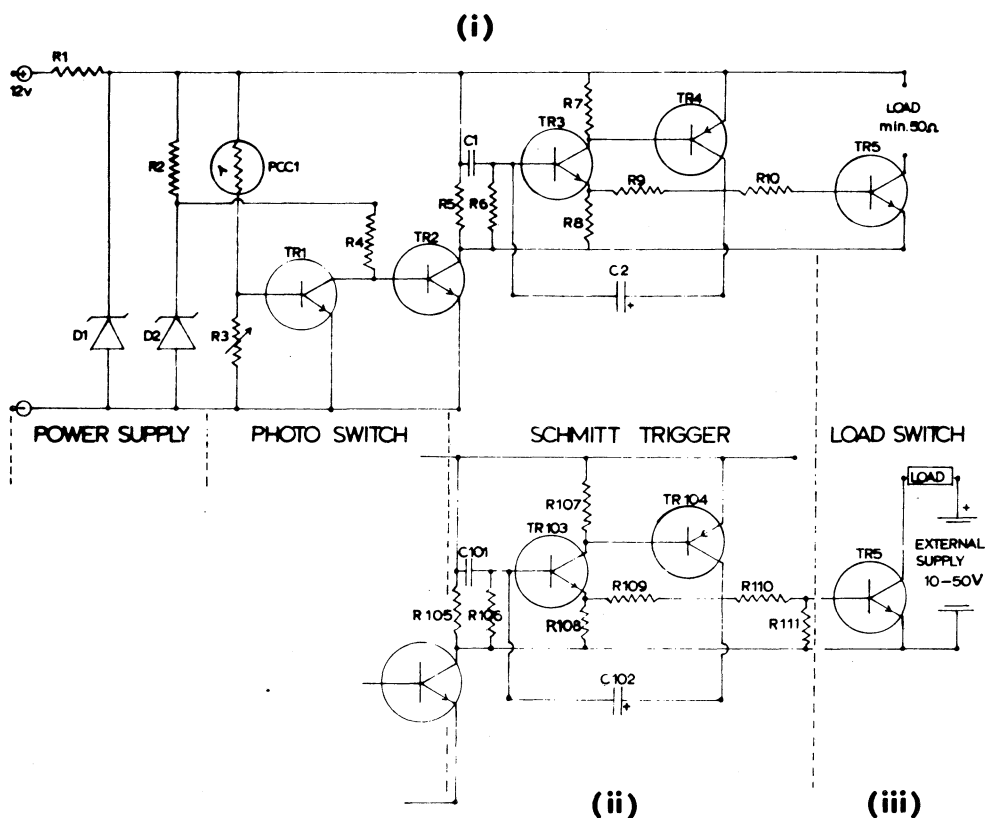


Fig. 1. Light activated relay driver.

COMPONENTS

R ₁	12 ohm 1/2 watt	C ₁	0.05 microfarad Mylar 50
R ₂	5.6 kilohm 1/2 watt	C ₂	12 " Electro 25
R ₃	100 " Trimpot		
R ₄	33 " 1/2 watt	D ₁	1S3009A 9 volt Zener diode
R ₅	4.7 " " "	D ₂	1S2039A 3.9 volt Zener diode
R ₆	1.2 " " "		
R ₇	2.2 " " "	TR ₁	BC109 TR ₁₀₃ BC109
R ₈	1 " " "	TR ₂	BC107 TR ₁₀₄ AC128
R ₉	1 " " "	TR ₃	AC127
R ₁₀	100 ohm " "	TR ₄	AC128
R ₁₀₅	470 kilohm	TR ₅	BC107
R ₁₀₆	3.9 Megohm		
R ₁₀₇	2.2 kilohm	C ₁₀₁	0.05 microfarad Mylar 50
R ₁₀₈	12 "	C ₁₀₂	2.2 " Electro 250
R ₁₀₉	12 "		
R ₁₁₀	680 ohm	PCC1	LDR Phillips
R ₁₁₁	680 "		